Santa Rosa CONSULTING

Introduction to LOINC® Code Mapping

- What are they and why are they important?

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Introduction to LOINC® code Mapping

What are they and why are they important?

- **Why are LOINC Codes Important?**

MEANINGFUL USE

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Current issues/problems with understanding laboratory results**
- **What are LOINC® codes**
- **What information is contained in a LOINC® code**
- **How to get LOINC® codes**
- **Uploading LOINC® codes to MEDITECH**
- **Ways to map LOINC® codes**
- **Tips and Pitfalls**
- **References and Acknowledgements**
- **Questions**

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Current issues/problems with understanding laboratory results**
  - Laboratories around the world use their own internal codes to identify laboratory tests and results
  - This makes it difficult for receiving systems to fully understand the results coming from the testing facility
  - If laboratories all used LOINC® to identify their tests and results, these problems would disappear
    - *Receiving facilities would be able to fully identify, understand, and file lab results from other facilities*
    - *Government agencies (such as state health departments) would be able to pool and track results that may have an effect on the community*
      - MRSA, VRE, HIV, Hepatitis, etc.

Introduction to LOINC® code Mapping

What are they and why are they important?

- **What are LOINC® codes**

Laboratory's → **L**ogical
Old and → **O**bservation
Inconsiderate → **I**dentifiers
Naming of → **N**ames and
Chemistry → **C**odes

Introduction to LOINC® code Mapping

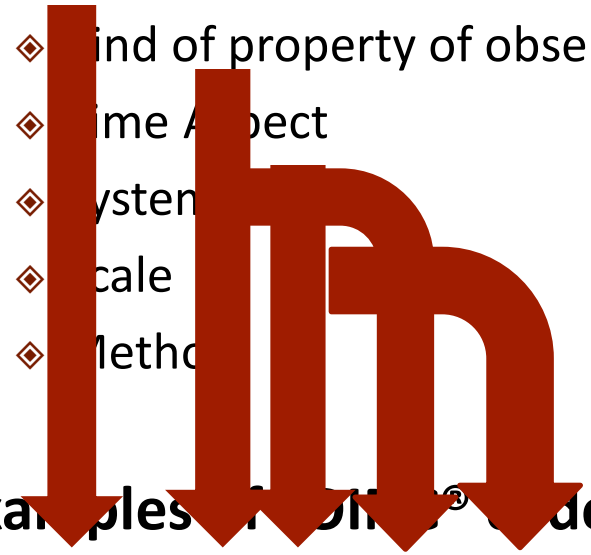
What are they and why are they important?

- **What are LOINC® codes**
  - LOINC ® was initiated in 1994 by the Regenstrief Institute and developed by Regenstrief and the LOINC® committee as a response to the demand for electronic movement of clinical data
  - The laboratory portion of the LOINC® database categories for
    - *Chemistry*
    - *Hematology*
    - *Serology*
    - *Microbiology*
    - *Toxicology*
  - Categories for drugs, cell counts, and antibiotic susceptibilities are also available
  - There is also a clinical portion for vital signs, intake/output, EKG, and other clinical observations

Introduction to LOINC® code Mapping

What are they and why are they important?

- **What information is contained in a LOINC® code**
  - Analyte/Component
  - Kind of property of observation or measurement
  - Time Aspect
  - System
  - Scale
  - Method



Examples of LOINC® codes

Sodium:SCnc:Pt:Ser/Plas:Qn
Sodium:SCnc:Pt:Urine:Qn
Sodium:SRat:24H:Urine:Qn

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What are they and why are they important?

- **What information is contained in a LOINC® code**
  - Analyte/Component
    - *Can be divided into three subparts*
      - Principle Name
      - Challenge – time delay, amount administered, route
      - Any standardization or adjustments – adjust result to temperature, pH
  - Kind of property of observation or measurement
    - *Distinguishes between different types of quantities for the same substance*
      - Determine differences in mass or substance (molar) concentrations
      - Absolute counts versus percent counts for cell counts
    - *Mass, Substance, Catalytic Activity, Arbitrary, and Number*
  - Time Aspect
    - *Point or moment in time versus a time interval*

Introduction to LOINC® code Mapping

What are they and why are they important?

- **What information is contained in a LOINC® code**
  - System
    - *Distinguish between blood, urine, serum, plasma, body fluid, CSF, etc.*
  - Scale
    - *Quantitative – exact number (e.g. 4.5)*
    - *Ordinal – categorical response (e.g. 1+, positive, reactive)*
    - *Narrative – free text responses (gram stain, culture results)*
  - Method
    - *Used to distinguish between two different methodologies for the same analyte*
    - *Not usually used in common chemistry, coagulation, or hematology procedures*
      - EIA vs. IF vs. IB

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What are they and why are they important?

- **How to get LOINC® codes**
  - The LOINC® code database can be downloaded free of charge from the LOINC® website
    - *www.loinc.org*
  - For MEDITECH users the ASCII Text format needs to be downloaded
  - User Guides and other documentation can also be downloaded from the website
  - Online training is available

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What are they and why are they important?

**Screenshot from www.LOINC .org*

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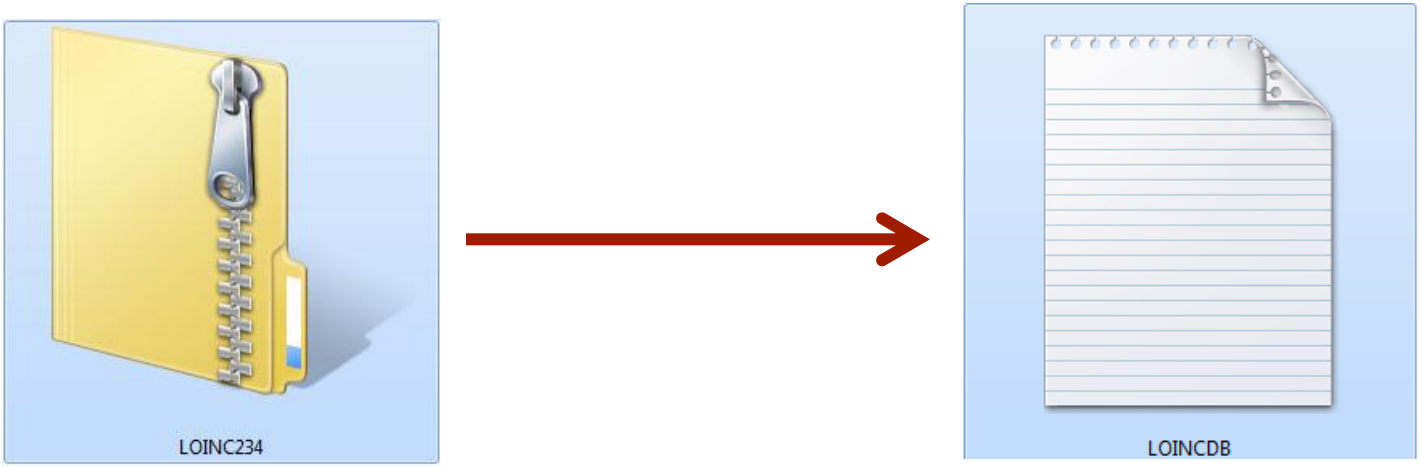
What are they and why are they important?

- **Uploading LOINC® codes to MEDITECH**
  - Once the LOINC® database has been downloaded from the LOINC® website they must be uploaded to MEDITECH for mapping
  - Unzip the LOINC® file so the LOINCDB text is available
  - Load the text file using the LOINC® Dictionary Routine



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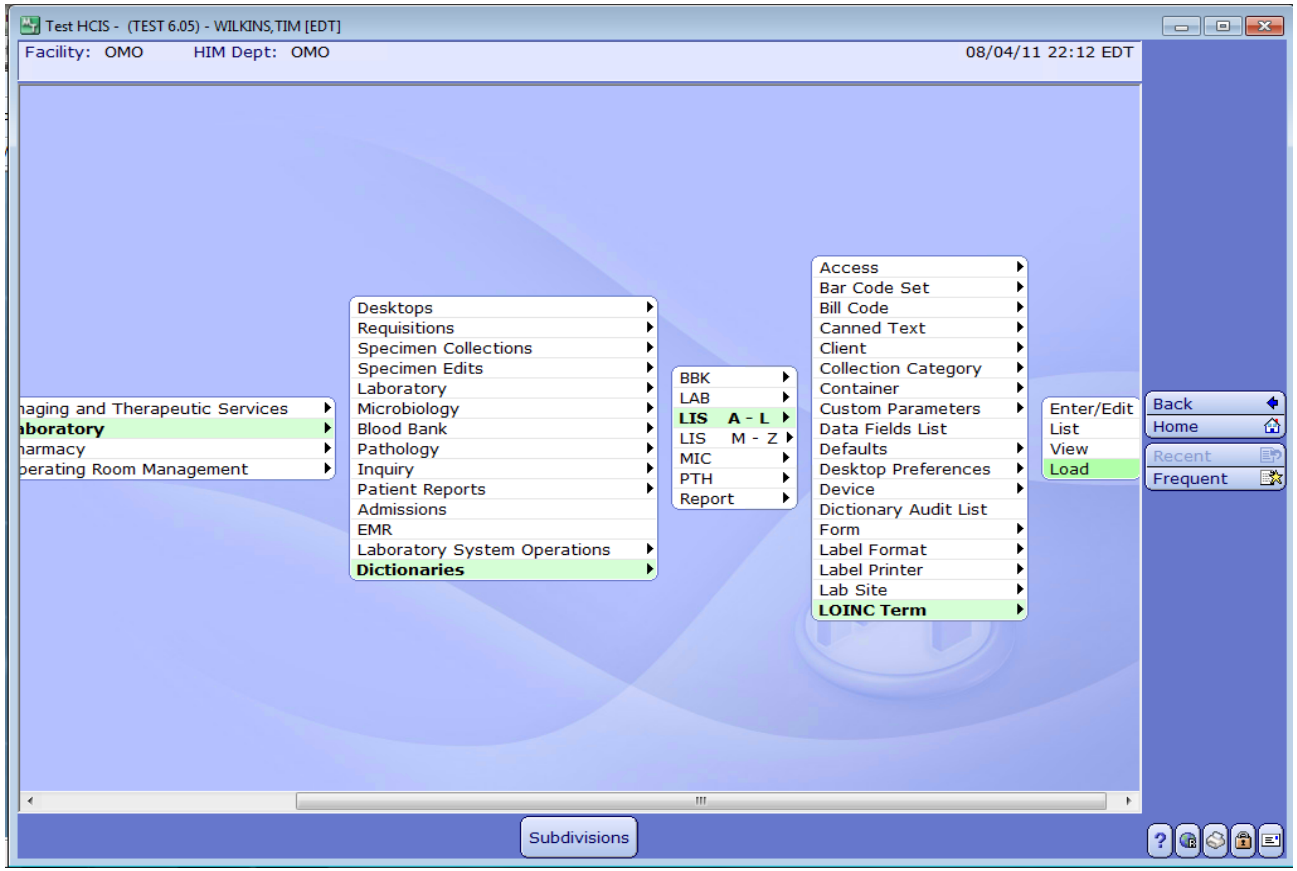
What are they and why are they important?

- **Uploading LOINC® codes to MEDITECH**



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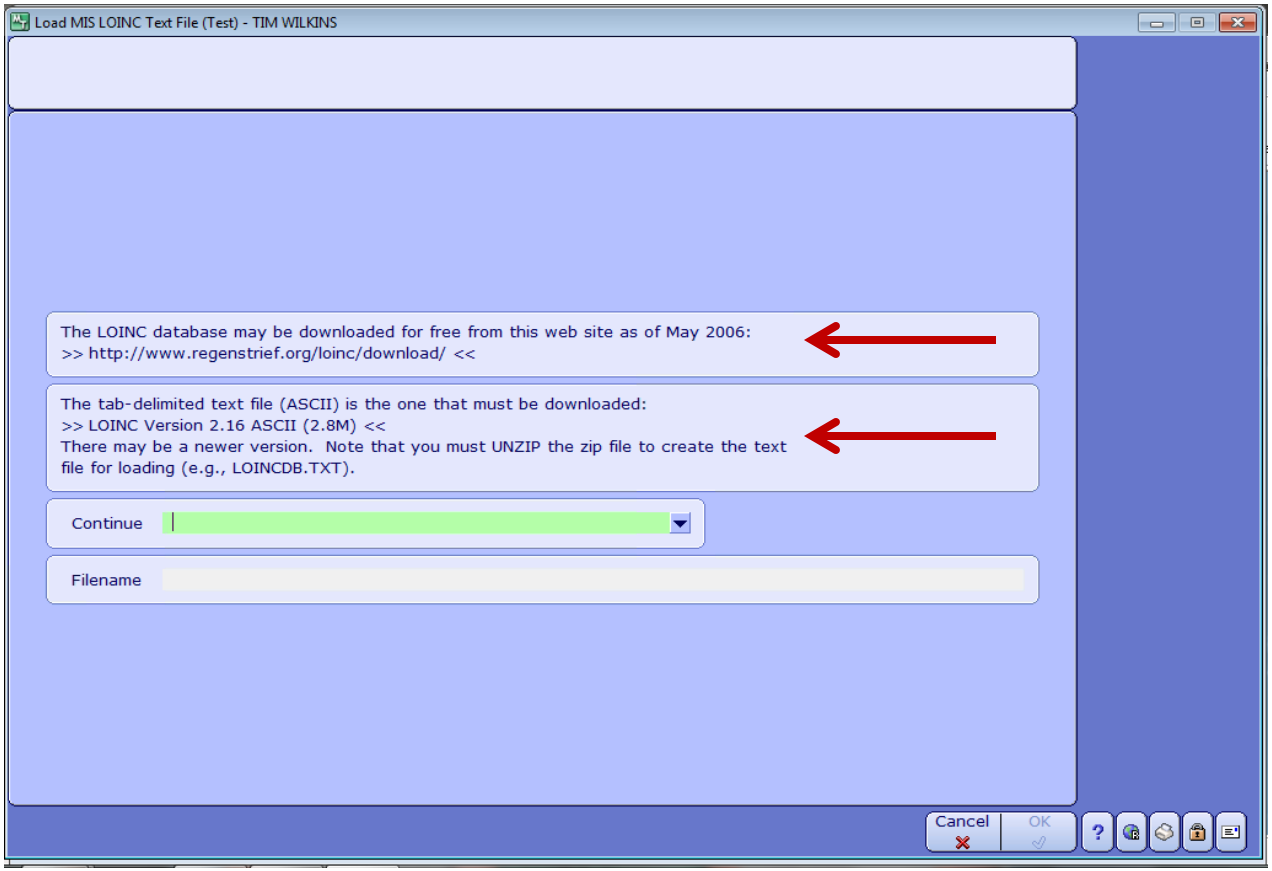
What are they and why are they important?

- **Uploading LOINC® codes to MEDITECH**



Introduction to LOINC® code Mapping

What are they and why are they important?

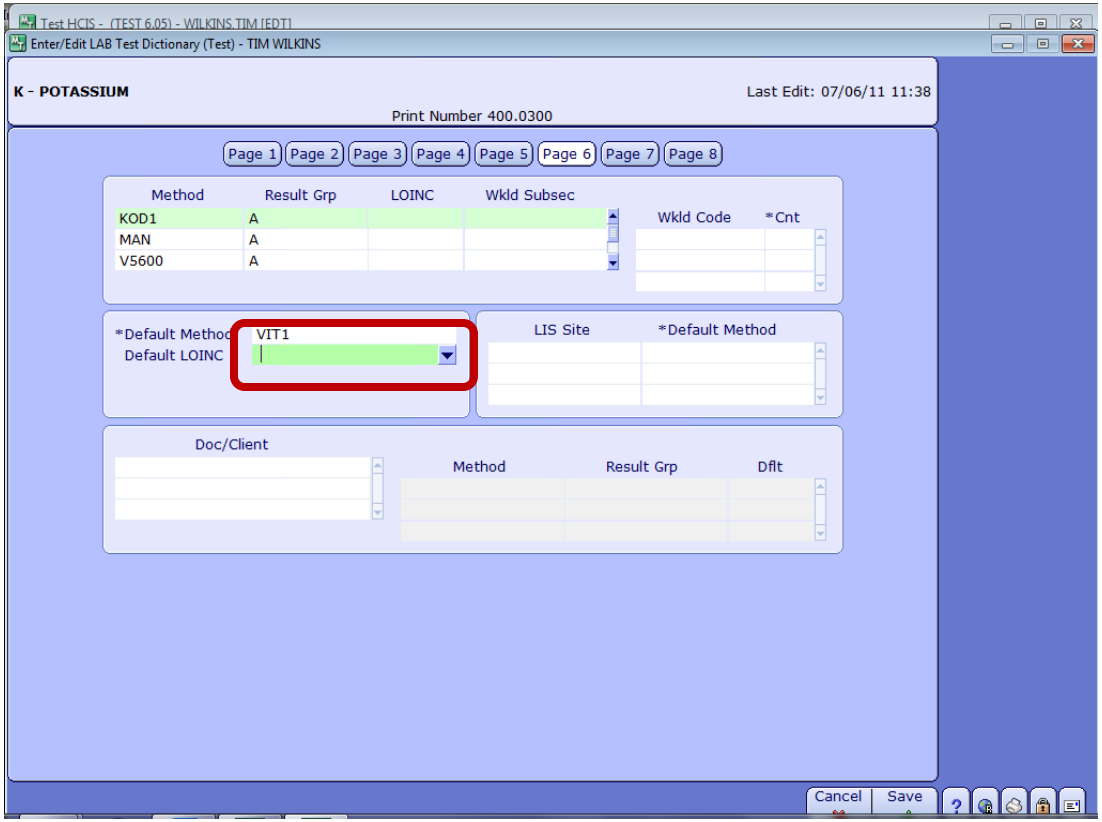
- **Ways to Map LOINC® Codes**
  - One by one Method
    - Must enter each test in the dictionary
    - Find the default LOINC® code field
    - If LOINC® code is known, it can be manually entered or
    - A (F9) look up can be performed to search for the appropriate LOINC® code
    - Save the dictionary entry

With over 2000 tests in the dictionaries this will be very time consuming

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - One by one Method



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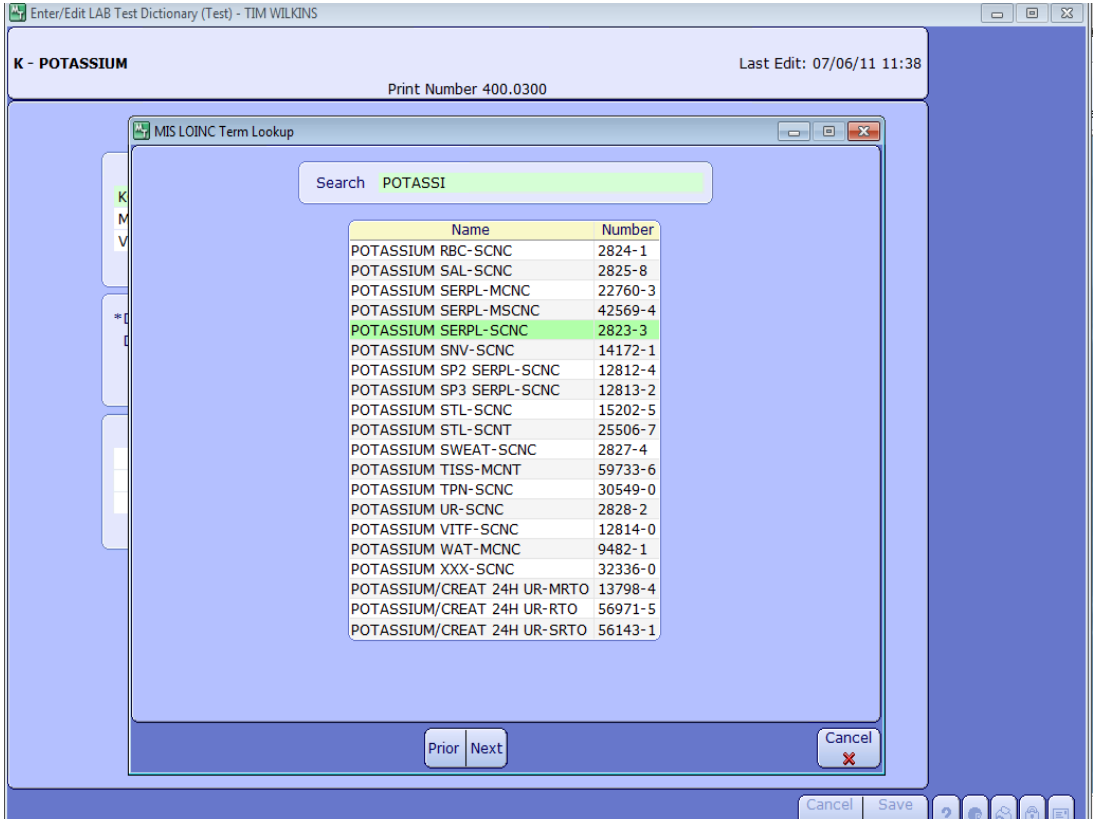
What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - One by one Method



Introduction to LOINC® code Mapping

What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - MEDITECH LOINC® Code Entry Routine
    - All Lab Tests will appear in a spreadsheet format
    - Enter LOINC® codes for each test directly in the spreadsheet
    - Accessing each test one by one in the Test Dictionary will not be necessary
    - All LOINC® codes are entered using the spreadsheet will flow directly to the appropriate test
    - The spreadsheet will track what has and has not been mapped
    - A utility is available to move mapped tests from TEST directly into LIVE

This method is only usable by systems at a level to meet Meaningful Use

- ***C/S 5.64 SR21***
- ***MAGIC 5.64 SR6***
- ***6.x will be available soon***

Unfortunately I do not have any screen shots of this process

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - Regenstrief LOINC Mapping Assistant
    - Can be downloaded free of charge from the LOINC® website
    - Can be downloaded as a package with the LOINC® codes
    - My preferred method for mapping LOINC® codes
    - Works in conjunction with LOINC® to facilitate mapping LOINC® codes
    - Much like MEDITECH's LOINC® Code Entry Routine
    - Once tests are loaded into the program, the tool will create a ranked list of appropriate codes for the test
    - After all tests have been mapped they can be loaded back into MEDITECH using a scripting tool
    - Will work for both C/S and MAGIC platforms that can utilize LOINC coding

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - The first step is to import local test codes into the tool
    - The easiest way to do this is with a simple “pipe” (|) delimited NPR report that pulls out
      - The test mnemonic
      - The test description
      - The test’s unit of measurement
      - A place holder for the LOINC® code
    - The report does not have to be “pretty”

”MNEMONIC”	”DESCRIPTION”	”MEASUREMENT”	”LOINC”
EOS	EOSINOPHIL(MANUAL DIFF)	%	
MBIL	BILIRUBIN,TOTAL	MG/DL	

Introduction to LOINC® code Mapping

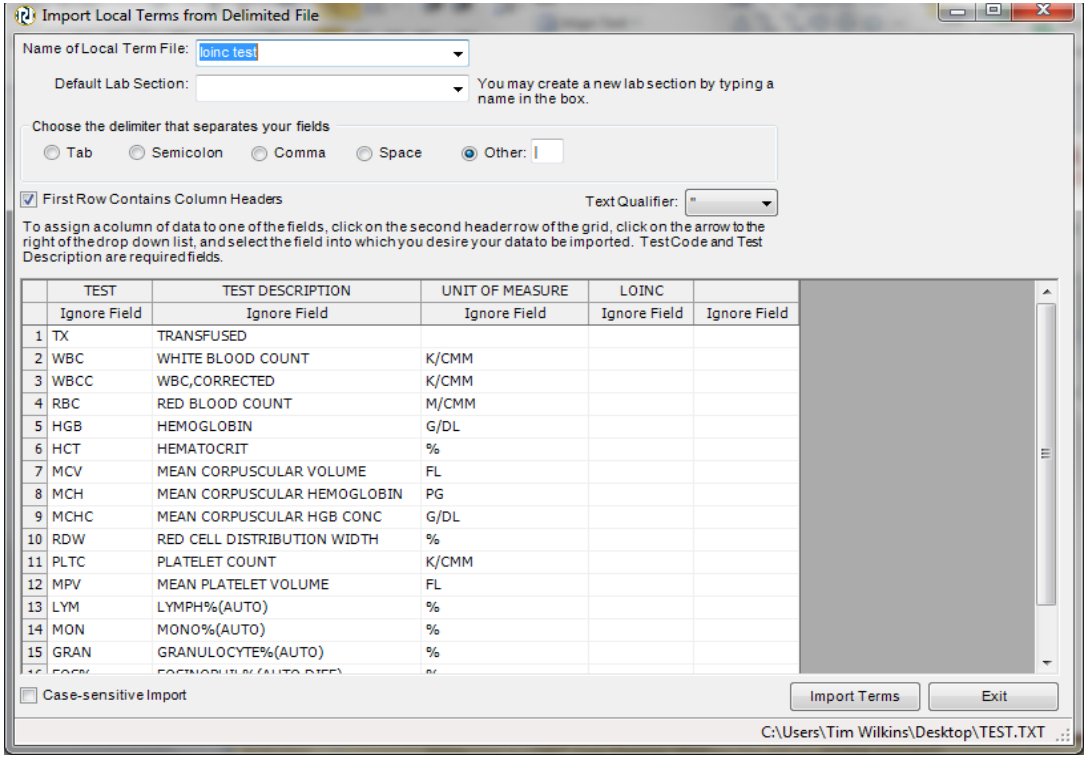
What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - Import Local Terms

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - Import Local Terms


Import Local Terms from Delimited File
Name of Local Term File: loinc test
Default Lab Section:
You may create a new lab section by typing a name in the box.
Choose the delimiter that separates your fields
Tab
Semicolon
Comma
Space
Other:
First Row Contains Column Headers
Text Qualifier: "
To assign a column of data to one of the fields, click on the second header row of the grid, click on the arrow to the right of the drop down list, and select the field into which you desire your data to be imported. Test Code and Test Description are required fields.
TEST
TEST DESCRIPTION
UNIT OF MEASURE
LOINC
Ignore Field
Ignore Field
Ignore Field
Ignore Field
Ignore Field
1 TX TRANSFUSED
2 WBC WHITE BLOOD COUNT K/CMM
3 WBCC WBC,CORRECTED K/CMM
4 RBC RED BLOOD COUNT M/CMM
5 HGB HEMOGLOBIN G/DL
6 HCT HEMATOCRIT %
7 MCV MEAN CORPUSCULAR VOLUME FL
8 MCH MEAN CORPUSCULAR HEMOGLOBIN PG
9 MCHC MEAN CORPUSCULAR HGB CONC G/DL
10 RDW RED CELL DISTRIBUTION WIDTH %
11 PLTC PLATELET COUNT K/CMM
12 MPV MEAN PLATELET VOLUME FL
13 LYM LYMPH%(AUTO) %
14 MON MONO%(AUTO) %
15 GRAN GRANULOCYTE%(AUTO) %
Case-sensitive Import
Import Terms
Exit
C:\Users\Tim Wilkins\Desktop\TEST.TXT

Introduction to LOINC® code Mapping

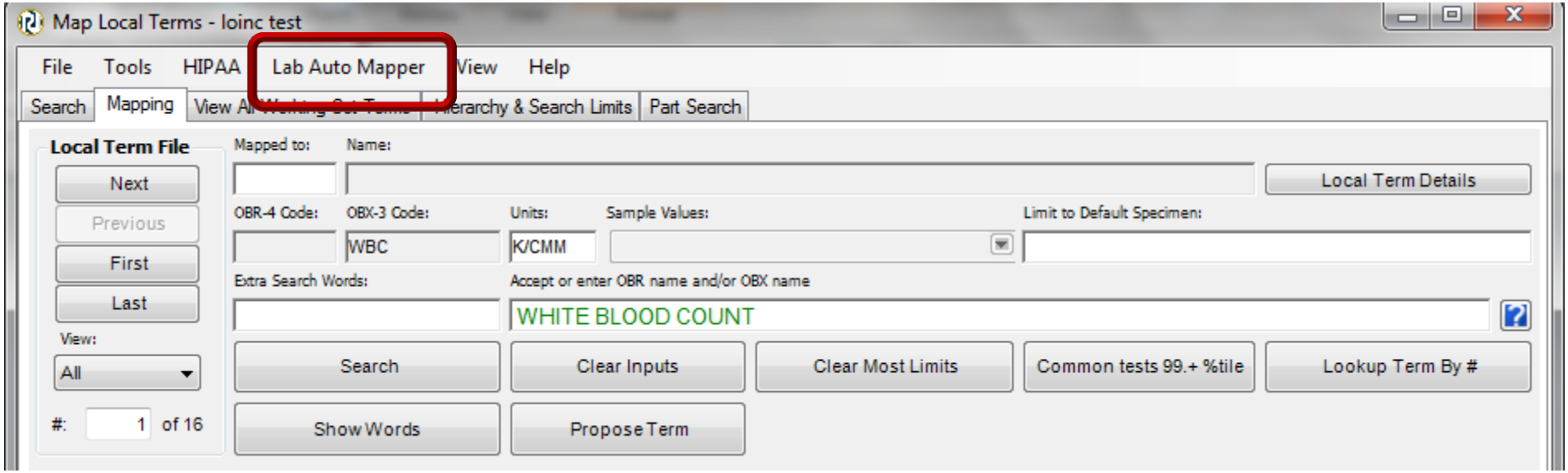
What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - Once the terms are important the program will look for any unrecognized terms
      - These could be special characters: $,&,_,or*
      - Could also be unique letter combinations that aren't understandable
    - The program will allow the user give definitions to any unknown terms
    - Once these have been resolved, the mapping can begin

Introduction to LOINC® code Mapping

What are they and why are they important?

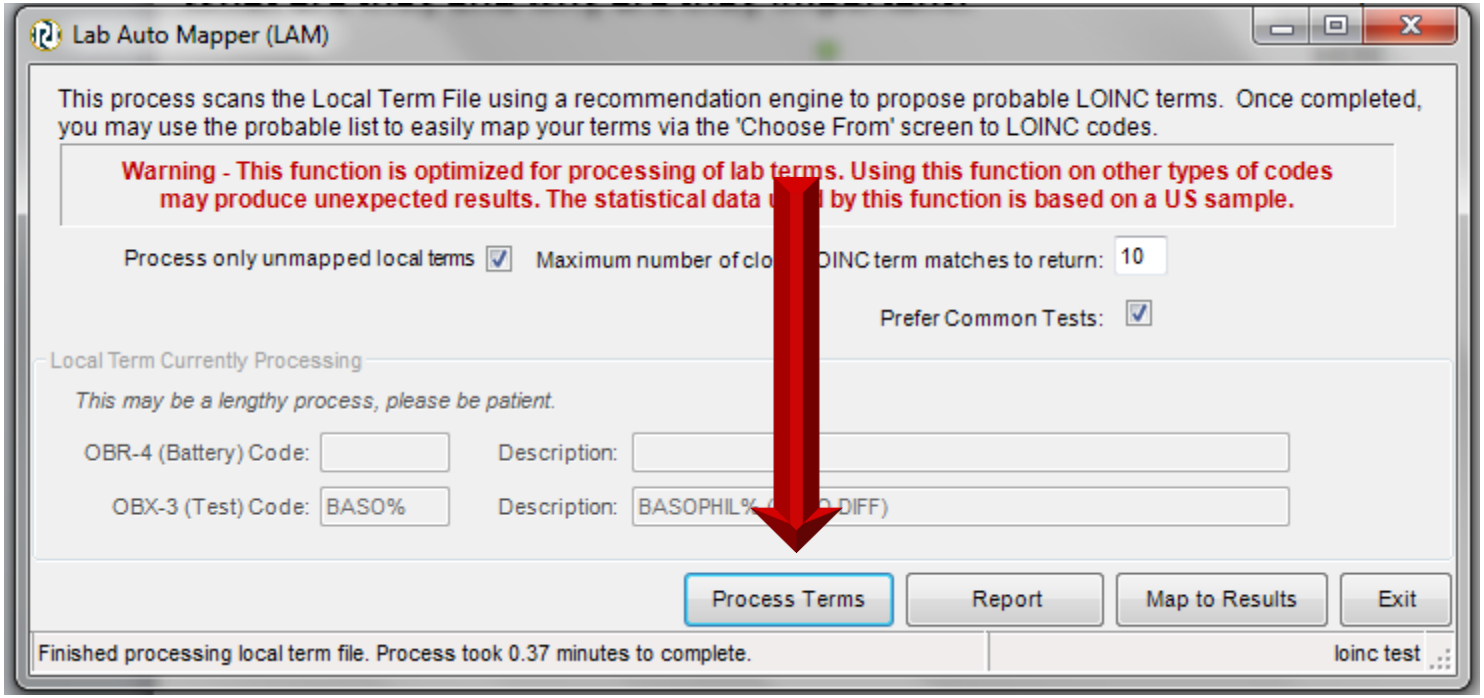
- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - Mapping Local Terms
    - Start off by using the “Lab Auto Mapper” Function at the top of the page



Introduction to LOINC® code Mapping

What are they and why are they important?

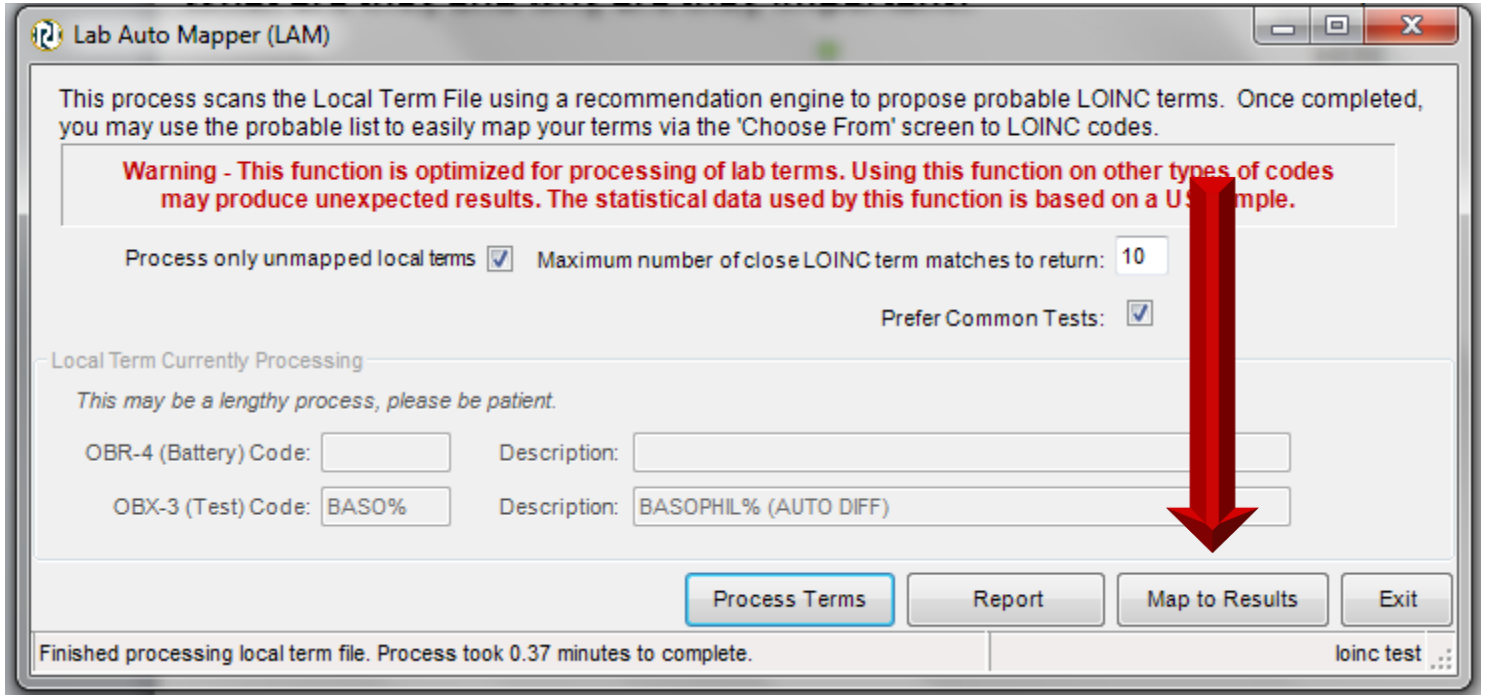
- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - Select the Process function will look at each term individually to see if there is an appropriate LOINC® code


Lab Auto Mapper (LAM)
This process scans the Local Term File using a recommendation engine to propose probable LOINC terms. Once completed, you may use the probable list to easily map your terms via the 'Choose From' screen to LOINC codes.
Warning - This function is optimized for processing of lab terms. Using this function on other types of codes may produce unexpected results. The statistical data
by this function is based on a US sample.
Process only unmapped local terms
Maximum number of clo
OINC term matches to return:
10
Prefer Common Tests:
Local Term Currently Processing
This may be a lengthy process, please be patient.
OBR-4 (Battery) Code:
Description:
OBX-3 (Test) Code:
BASO%
Description:
BASOPHIL%
DIFF)
Process Terms
Report
Map to Results
Exit
Finished processing local term file. Process took 0.37 minutes to complete.
loinc test

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - When processing is complete
    - Select “Map to Results” to begin the real fun


Lab Auto Mapper (LAM)
This process scans the Local Term File using a recommendation engine to propose probable LOINC terms. Once completed, you may use the probable list to easily map your terms via the 'Choose From' screen to LOINC codes.
Warning - This function is optimized for processing of lab terms. Using this function on other types of codes may produce unexpected results. The statistical data used by this function is based on a U mple.
Process only unmapped local terms
Maximum number of close LOINC term matches to return: 10
Prefer Common Tests:
Local Term Currently Processing
This may be a lengthy process, please be patient.
OBR-4 (Battery) Code:
Description:
OBX-3 (Test) Code: BASO%
Description: BASOPHIL% (AUTO DIFF)
Process Terms
Report
Map to Results
Exit
Finished processing local term file. Process took 0.37 minutes to complete.
loinc test

Introduction to LOINC® code Mapping

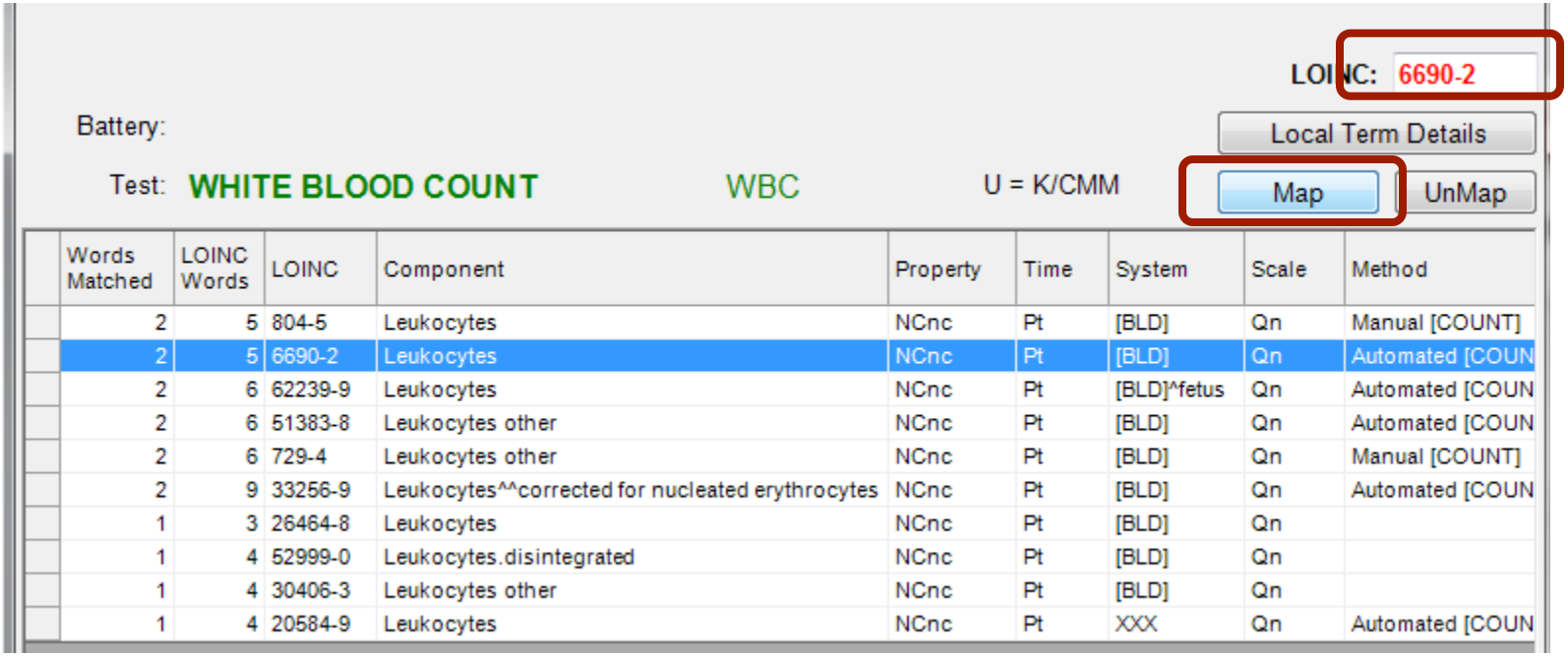
What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - To map the test, select the best result that matches the test in question
      - Be sure to look closely to select the correct
        - Property
        - Scale
        - Method
        - Time
        - System
      - Not every test will match perfectly
      - Will have to generalize at times if there is not an exact match

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool



Words Matched	LOINC Words	LOINC	Component	Property	Time	System	Scale	Method
2	5	804-5	Leukocytes	NCnc	Pt	[BLD]	Qn	Manual [COUNT]
2	5	6690-2	Leukocytes	NCnc	Pt	[BLD]	Qn	Automated [COUN
2	6	62239-9	Leukocytes	NCnc	Pt	[BLD]^fetus	Qn	Automated [COUN
2	6	51383-8	Leukocytes other	NCnc	Pt	[BLD]	Qn	Automated [COUN
2	6	729-4	Leukocytes other	NCnc	Pt	[BLD]	Qn	Manual [COUNT]
2	9	33256-9	Leukocytes^^corrected for nucleated erythrocytes	NCnc	Pt	[BLD]	Qn	Automated [COUN
1	3	26464-8	Leukocytes	NCnc	Pt	[BLD]	Qn	
1	4	52999-0	Leukocytes.disintegrated	NCnc	Pt	[BLD]	Qn	
1	4	30406-3	Leukocytes other	NCnc	Pt	[BLD]	Qn	
1	4	20584-9	Leukocytes	NCnc	Pt	XXX	Qn	Automated [COUN

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What are they and why are they important?

- **Ways to Map LOINC® Codes**
  - RELMA® Mapping Tool
    - Continue this process until all tests have been mapped
    - Once mapped, the information can be exported back into a text file

    - Once the terms have been exported back into a text file they can be scripted back into MEDITECH using a scripting tool: Boston Workstation, Summit

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Tips and Pitfalls**
  - Tips
    - Once the TEST database has been mapped, there is no need to start over from scratch with the LIVE database
      - Use the Exported file from the TEST database and use it for scripting back into the LIVE Database
      - May not be exact, but should only have a few “holes” that will need to be mapped
      - Run the NPR reports again and import back into RELMA® to begin mapping
    - Remember LOINC® codes for the Microbiology Antibiotics will have to be mapped once for MIC codes and again for KB codes
    - Sometimes it is better to give a more general code for esoteric tests as reference lab methods may change without notice
      - IB vs EIA vs IF

Introduction to LOINC® code Mapping

What are they and why are they important?

- **Tips and Pitfalls**
  - Pitfalls
    - Much of the Microbiology Procedure and Organism Dictionaries cannot be mapped to an exact code
      - Only organism specific tests (Legionella, Shigella, etc.) and stains can be mapped
      - Others will have to be mapped as aerobic , anaerobic, fungal, or AFB cultures
      - Most of the organisms are not in the LOINC® database
      - Again these will have to be mapped as aerobic, anaerobic, AFB, or Fungal organism identified
    - Any tests that are used for “internal” use only (Sent to State Lab) will not be able to be mapped
    - Check Cells in BBK will not be able to be mapped. However, these are not reported and would not appear in an HL7 message

Introduction to LOINC® code Mapping

What are they and why are they important?

- **References**
  - All of the information presented was gathered from information from the following sources:
    - LOINC® website - www.loinc.org
    - LOINC® online user's manual
    - RELMA® online user's manual
    - MEDITECH Knowledge Base Articles

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What are they and why are they important?

- **Acknowledgements**

A Special Thank You to Onslow Memorial Hospital in Jacksonville, NC for allowing us to utilize screen shots from their facility.

Onslow MEMORIAL HOSPITAL
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Thanks again to: Hope Daugherty, LIS Specialist
Mike House, CIO

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What are they and why are they important?

Questions?

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What are they and why are they important?

- **If you have further questions**

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